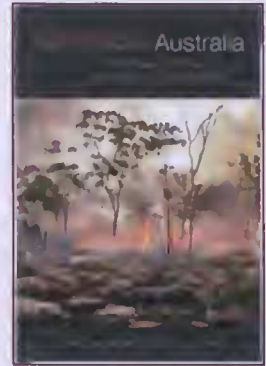


Book Review

Flammable Australia. Fire Regimes, Biodiversity and Ecosystems in a Changing World.

By R.A. Bradstock, A.M. Gill and R.J. Williams (eds). CSIRO Publishing, Collingwood, Melbourne. 2012; 333 pp; paperback. ISBN: 9780643104822. Price A\$79.95.

Fire is an ecological and physical factor of great relevance in monsoonal northern Australia, and there is ample evidence of fire on an almost daily basis in the dry season. It was therefore with some sense of expectation that I read the 2012 edition of *Flammable Australia*. This is the most recent incarnation of an assemblage of the latest information from fire experts from around Australia. Previous editions were published in 2002 (*Flammable Australia: the Fire Regimes and Biodiversity of a Continent* eds R.A. Bradstock, J.E. Williams and A.M. Gill. Cambridge University Press, Cambridge) and before that in 1981 (*Fire and the Australian Biota* eds A.M. Gill, R.H. Groves and I.R. Noble. Australian Academy of Science, Canberra). The Charles Darwin University library copy of the chapter by Williams *et al.* (Fire regimes and biodiversity in the savannas of northern Australia) in the 2002 edition is well-thumbed and evidently widely read, giving some indication of the interest in fire ecology in this part of the world.



In a country as large as Australia, a major issue is how to deal with diverse fire regimes that are affected by contrasting climatic conditions in different parts of the continent. Parts of the book are thus of only partial relevance to northern Australia. For example, Chapter 3 by Sullivan *et al.* ('Fuel, fire weather and fire behaviour in Australian ecosystems') provides an introduction to fire weather and the factors that initiate and promote fire (temperature, humidity, wind, fuels, etc.). However, I found it slightly frustrating as there was no specific reference to savannas, these regions being subsumed under the general heading of 'grasslands'. Sullivan *et al.* also examine climate patterns and suggest that the fire season moves south as the year progresses, so that in northern Australia the peak fire season occurs during 'winter and spring' (= dry season) whereas in southern Australia it peaks in summer. In Chapter 4 on remote sensing, we learn that northern Australia has the highest fire frequency on the continent, with some areas in the Top End burnt every year. Several other chapters deal with the prehistory of fire, global change, carbon, and arid zone and southern biomes, and all are supplied with an extensive list of references.

Although the book includes 15 chapters, my focus in this review is on those chapters that are most relevant to monsoonal northern Australia. These are Chapter 2

by David Bowman *et al.* ('Fire regimes and the evolution of the Australian biota'), Chapter 8 by Rod Fensham ('Fire regimes and biodiversity in the savannas of northern Australia') and Chapter 14 by Garry Cook *et al.* ('A revolution in northern Australian fire management: recognition of Indigenous knowledge, practice and management').

Amongst other matters, Bowman *et al.* (Chapter 2) discuss the 'Mutch hypothesis', the theory that fire and plants in Australia have coevolved, so that we have many fire-tolerant and often highly flammable plants. This is the widely held and pervasive idea that the Australian bush is somehow 'meant to burn'. However, as these authors point out, "it is difficult to confidently attribute plant traits that promote flammability as fire adaptations", and "there are no unambiguous plant features in the fossil record that can be interpreted as fire-related adaptations". The authors discuss the timing of the evolution of epicormic buds (sprouts that emerge from aerial stems or branches after fire) in the Myrtaceae. They also dispel the notion that indigenous burning caused the evolution of fire-adapted species—although from a human perspective people colonised Australia a very long time ago, from an evolutionary and biogeographical standpoint this is a very short history indeed.

The tropical savannas of northern Australia extend across the Kimberley, Top End and northern Queensland. Fensham (Chapter 8) discusses the influence of fire on rainforest-savanna boundaries and examines the conditions that are conducive to the development of rainforest and the role of lightning. The tree recruitment bottleneck (the notion that few saplings are able to attain sufficient height and thus mature in areas that are regularly burnt) is another hypothesis that is examined, but the issue is more complicated than it first appears. Research is continuing on how trees in the savannas might escape the bottleneck. This may become more difficult as fuel loads and fire intensity are increasing significantly with the invasion of gamba and mission grass, which appear to be irreversibly simplifying the savannas.

Cook *et al.* (Chapter 14) discuss indigenous fire management and the breakdown of traditional burning practices with European colonisation. These themes are explored in greater detail in another recently published book by Russell-Smith *et al.* (2009): *Culture, Ecology and Economy of Fire Management in North Australian Savannas: Rekindling the Wurrk Tradition*. As we consider the ongoing issue of fire in the landscape we are left wondering what type of fire regimes we should adopt in the future. This is problematic given the addition of climate change, habitat fragmentation, changing land use, invasive animals and plants, and the mystery of mammal declines to the equation. Humans are now (and have been for some time) the principal fire managers in the landscapes of northern Australia. As was noted by Williams *et al.* in the previous edition of *Flammable Australia*, "ignition in the savannas is overwhelmingly due to human activity". Bowman *et al.* contrasts European fire management with the patchwork created by Aboriginal burning, and the infrequent lightning-initiated fires before humans arrived. There will undoubtedly be further

alterations to the ecology of natural areas before we find a workable compromise, but hopefully this will occur before we do irreparable harm. Regardless of our attitudes to fire and what type of fire regime we would prefer, it is important that we give some thought as to why we are burning (as Aboriginal people traditionally did) *before* we burn. Hopefully this book will go some way to helping us make informed decisions about dealing with this vital component of Australian ecosystems.

In summary, the book is generally well presented with many figures (including some in colour) and tables, and is moderately priced for a technical book of this sort. The book will be of interest to researchers and environmental scientists, and portions of the text will appeal to the general reader of natural history.

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